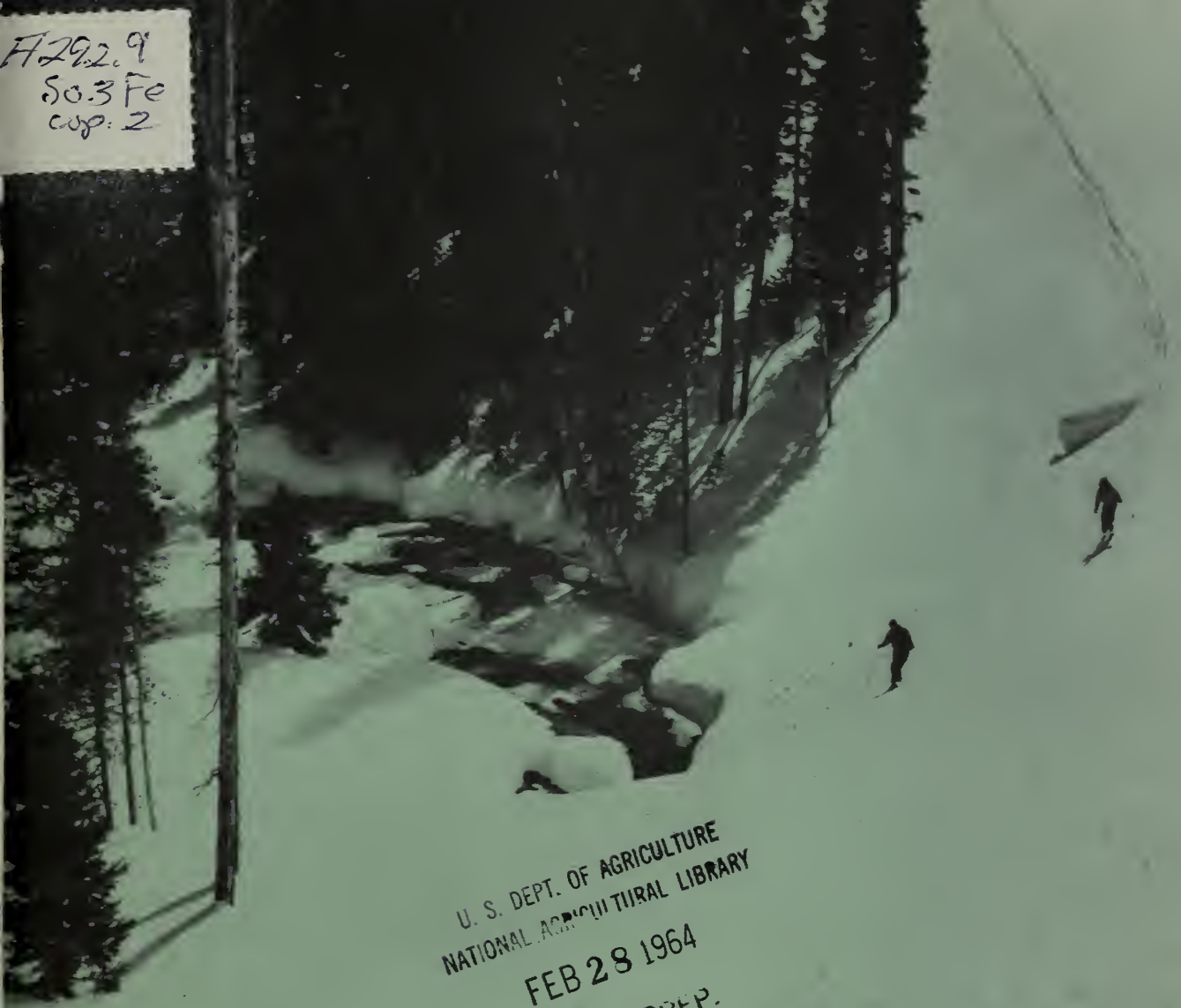

WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
WASHINGTON

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

AS OF
JUNE 1, 1963

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 4170, Portland 8, Oregon.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

REPORTS	ISSUED	AGENCY
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RIGHTS BR., DEPT. OF LANDS, FORESTS AND NATURAL RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

USDA SCS PORT., AND OREG. 962

FEDERAL-STATE-COOPERATIVE

SNOW SURVEY AND WATER SUPPLY FORECASTS

For

WASHINGTON

Report Prepared
By

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840 Bon Marche Building
Spokane, Washington

Issued By

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State Conservationist
Soil Conservation Service
U. S. Department of Agriculture

Murray G. Walker, Supervisor
Division of Water Resources
Department of Conservation
State of Washington

WATER SUPPLY OUTLOOK

State of Washington
June 1, 1963

Precipitation during the past month has been below normal except for a few isolated locations. Runoff over the state has ranged from 50% to 75% of normal with a few stations having even less. The snow is gone for all practical purposes in the mountains with only a few drifts remaining at the higher elevations. Forecasts as given last month should probably be reduced because of this below normal precipitation condition.

Very few snow courses were measured over the state on the first of June but more were measured on May 15. Measurements at the snow courses as of the 15th indicated mostly bare ground and no additional snow fell. The better snow cover that was measured was in the Okanogan drainage in Canada where many courses indicated on the 15th a snowpack greater than was measured in 1962 and in some cases 1961. The same courses on June 1 reported no snow or conditions worse than were measured last year.

Streamflows in the state have been considerably less than normal with the Columbia River reporting 73% of normal and other streams with a reported runoff of from 50% to 75% of normal. Forecast of the Columbia River at The Dalles for the June-September period is now expected to be 47,000,000 acre feet as compared to a normal of 64,300,000. This is 73% of normal.

Reservoirs throughout the state are all in excellent shape and those that are not full at this time are expected to fill with the spring runoff. Soil moisture as measured near the first of June indicates that the soil mantle is starting to dry out but generally speaking is in excellent shape for this time of year.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR 1/	USABLE CAPACITY	Measured (June 1) 1963	1962	1961	Normal*
			COLUMBIA			
Spokane	Coeur d'Alene Lake	889.0	194.2	283.0	206.5	351.4
Columbia	Franklin D. Roosevelt Lake	5232.0	4063.0	3487.0	4159.0	4832.4
Columbia	Banks Lake 2/	761.8	281.0	521.3	359.0	---
Okanogan	Conconully Reservoir	13.0	11.2	6.6	12.9	---
Okanogan	Salmon Lake	10.5	8.1	8.3	10.3	---
Chelan	Lake Chelan	676.1	595.4	462.4	124.3	502.7
			YAKIMA			
Yakima	Keechelus Lake	157.8	160.0	159.1	154.3	139.9
Kachess	Kachess Lake	239.0	242.8	236.8	229.3	224.4
Cle Elum	Lake Cle Elum	436.9	442.5	439.4	373.6	416.3
Bumping	Bumping Lake	33.7	36.0	34.2	26.0	34.6
Tieton	Rimrock Lake	198.0	200.2	186.1	182.1	185.3
			PUGET SOUND			
Skagit	Ross Reservoir	1202.9	1315.1	991.6	1224.7	574.8
Skagit	Diablo Reservoir	90.6	85.9	84.6	84.1	85.9
Skagit	Gorge Reservoir	9.8	7.9	8.5	8.5	---

1/ Based on active storage.
2/ Less than 15-year record in period 1943-57.

* 15-year average 1943-57

SOIL MOISTURE - JUNE

Drainage Basin and Station	Number	Elev.	Profile (Inches) Depth	Profile (Inches) Total Capacity	Soil Moisture Content (Inches) as of June 1 1963	1962	1961
CRAB CREEK							
Creston-Kunz	18B1M	2400	48	13.6	9.03	10.23	8.56
Govan	18B2M	2100	48	13.6	10.86	10.00	11.95
Jack Woods	18B3M	2600	48	13.6	8.94	7.23	9.51
Krause	18B4M	2440	48	13.6	8.74	9.22	8.99
Sheffels	18B5M	2360	48	13.6	6.62	5.39	8.32
Wheatridge	18B6M	2200	48	13.6	7.07	5.91	7.08
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	11.00	13.06	10.50

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches) Depth	Profile (Inches) Total Capacity	Soil Moisture Content (Inches) as of Oct. 1 1962	1961	1960
CRAB CREEK							
Creston-Kunz	18B1M	2440	48	13.6	9.40	4.25	4.04
Govan	18B2M	2100	48	13.6	9.95	5.60	5.08
Jack Woods	18B3M	2600	48	13.6	7.06	7.35	3.87
Krause	18B4M	2440	48	13.6	9.47	4.99	4.84
Sheffels	18B5M	2360	48	13.6	6.69	3.67	4.07
Wheatridge	18B6M	2200	48	13.6	7.49	4.09	4.79
OKANOGAN							
Trout Creek	3-M	3600	48	7.3	2.80	3.00	3.00
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	6.80	9.50	7.00
WALLA WALLA							
Couse	17C3M	3650	48	11.1	7.20	6.60	---
Helmers	17C2M	4400	48	12.0	7.60	6.90	---

APPENDIX 1

SNOW DATA - MAY 15 & JUNE 1, 1963

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
UPPER COLUMBIA DRAINAGE								
PEND OREILLE RIVER								
Nelson	Canada	3050	5/14	0	0.0	--	0.0	--
KETTLE RIVER								
Monashee Pass	Canada	4500	5/15	26	10.3	9.7	9.6	--
			5/31	0	0.0	1.3	0.0	--
OKANOGAN RIVER								
Blackwall Mtn.	Canada	6250	5/17	71	32.1	26.9	44.0	--
			6/3	31	17.6	21.2	32.0	--
Hamilton Hill	Canada	4900	5/12	8	4.1	2.5	9.6	--
			5/29	0	0.0	0.0	0.0	--
Lost Horse Mtn.	Canada	6300	5/15	25	7.9	11.4	11.2	--
			6/1	Not Meas.		5.4	3.8	--
McCulloch	Canada	4200	5/15	2	0.4	0.8	0.5	0.8**
Missezula Mtn.	Canada	5100	5/15	Not Meas.		0.9	3.5	--
			6/3	0	0.0	0.0	0.0	--
Mission Creek	Canada	6000	5/14	52	20.2	18.5	23.9	18.4**
			5/31	12	4.6	12.1	11.1	10.2**
Monashee Pass	Canada	4500	5/15	26	10.3	9.7	9.6	--
			5/31	0	0.0	1.3	0.0	--
Silver Star Mtn.	Canada	6050	5/15	56	23.3	19.9	26.0	--
			5/31	12	5.6	9.1	5.4	--
Trout Creek	Canada	4700	5/15	1	0.7	--	1.8	1.3**
CHELAN LAKE BASIN								
Safety Harbor	20 A 30		5/13	72	27.5	New Course		
WENATCHEE RIVER								
Stevens Pass	21 B 1	4070	5/14	68	27.3	42.2	52.8	43.9*
			5/31	16	7.5	25.2	31.8	27.1*
YAKIMA RIVER								
Bumping Lake	21 C 8	3450	5/15	0	0.0	0.0	1.6	3.6*
Lake Cle Elum	21 B 14M	2200	5/15	0	0.0	0.0	0.0	0.0*

* Adjusted 1943-57 average
** Average for years of record

APPENDIX 2

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT 1963 Date of Survey	Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1962	1961	1943-57 Avg.
YAKIMA RIVER (Cont'd)								
#Stampede Pass	21 B 10	3000	5/17	33	16.2	26.7	39.2	31.8*
			6/4	0	0.0	11.4	12.7	15.5*
Tunnel Avenue	21 B 8	2450	5/15	0	0.0	0.0	11.3	9.3*
White Pass (Ea. Side)	21 C 28	4500	5/15	Not Meas.		17.3	26.1	31.5*
			5/31	0	0.0	11.7	16.1	--
LOWER COLUMBIA DRAINAGE								
COWLITZ RIVER								
White Pass (Ea. Side)	21 C 28	4500	5/15	Not Meas.		17.3	26.1	31.5*
			5/31	0	0.0	11.7	16.1	--
PUGET SOUND DRAINAGE								
GREEN RIVER								
Stampede Pass	21 B 10	3000	5/17	33	16.2	26.7	39.2	31.8*
			6/4	0	0.0	11.4	12.7	15.5*
SKYKOMISH RIVER								
#Stevens Pass	21 B 1	4070	5/14	68	27.3	42.2	52.8	43.9*
			5/31	16	7.5	25.2	31.8	27.1*
BAKER RIVER								
Dock Butte	21 A 11A	3800	5/17	91	46.6	62.6	72.6	--
			6/1	Not Meas.		49.5	50.3	--
Easy Pass	21 A 7A	5200	5/17	140	75.2	85.6	96.7	--
			6/1	Not Meas.		72.3	80.7	--
Jasper Pass	21 A 6A	5400	5/17	164	81.1	85.9	114.1	--
			6/1	Not Meas.		77.7	101.4	--
Marten Lake	21 A 9A	3600	5/17	98	49.2	69.1	72.7	--
			6/1	Not Meas.		60.5	56.1	--
Schreibers Meadow	21 A 10A	3400	5/17	72	35.3	53.6	56.6	--
			6/1	Not Meas.		43.4	40.9	--
Watson Lakes	21 A 8A	4500	5/17	98	49.9	58.7	78.6	--
			6/1	Not Meas.		49.6	65.0	--

\# Not located directly on this drainage
* Adjusted 1943-57 average

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

Department of the Army
  Corps of Engineers
U. S. Department of Agriculture
  Forest Service
U. S. Department of Commerce
  Weather Bureau
U. S. Department of the Interior
  Bonneville Power Administration
  Bureau of Reclamation
  Geological Survey
  National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
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